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► **STUDYING** the universe, and particularly the sun, from earth-circling artificial satellites to obtain an unobstructed view 24 hours a day will be possible within a year or two.

Dr. Leo Goldberg, director of the University of Michigan Observatory, predicted that astronomy from satellites is just around the corner in the 25th annual James Arthur Lecture at the Smithsonian Institution.

A payload of only 300 pounds, believed "certainly feasible" within two years, would be sufficient for instruments needed by the solar satellite, Dr. Goldberg said. Plans for such a satellite, which would orbit at a height of 400 miles in a path from pole to pole to obtain continual sunshine, have been drawn by a St. Louis aircraft manufacturer.

The biggest problem of present-day solar observations is that much of the sun's radiation, including the ultraviolet, is absorbed by the earth's atmosphere. The visible light reaching the earth's surface does not tell the whole story of the sun's voluminous outpourings.

Dr. Goldberg said that the satellite's 300-pound instrument package would include a stabilization and control system for precision pointing of the instruments at the sun, power supply, and equipment for recording data and transmitting the information on command from earth.

Because the delicate instruments would have to withstand the severe shocks and accelerations of launching, Dr. Goldberg reported that intensive laboratory experiments would be needed to prevent damage.

Studies made so far with high-flying rockets give only a brief glimpse of solar events. A large satellite would give long-period information not only about the sun but about the entire universe.

Dr. Goldberg said solar studies should have the highest priority for the following three reasons:

1. The sun is such an intense source of radiation that instrumental problems would be at a minimum.

2. The influence of the sun upon all of earth is of very great interest to geophysicists and meteorologists as well as astronomers.

3. Observations from the earth's surface in the past have made it clear what to look for in scanning the sun.

Science News Letter, November 8, 1958

PHYSIOLOGY

Temperate Zones May Be Man's Limits for Cold

► **MEN LIVING** in the temperate zones had better not leave home for colder climes.

The areas between the Tropic of Cancer and the Arctic Circle and between the Tropic of Capricorn and the Antarctic Circle represent the limits as far as their cold endurance goes, a scientist reports in *Nature* (Oct. 25).

Persons can adapt to artificial or naturally hot environments relatively easily, says Dr. R. K. Macpherson of the division of human physiology, National Institute of Medical Research, London. However, when they are

transferred from a temperate climate to a cold one, there is no comparable adaptation.

This puzzling behavior can be understood if man is considered as an animal, without clothing, fire or shelter, Dr. Macpherson explains.

The critical temperature for naked man is 25 to 27 degrees centigrade or about 77 degrees Fahrenheit. His scanty hair provides little insulation, yet he has an "unequalled ability to sweat" and a capacity for extreme dilation of the skin blood vessels, both of them good mechanisms for heat loss.

Further evidence that men in a temperate climate are approaching the maximum adaptation to cold is found in Europeans' adjustment to life in the tropics. After about 18 months, their ability to work in the heat is as great as that of the natives, Dr. Macpherson says. Exposure to artificially higher temperatures indicates they have an even greater heat tolerance.

Science News Letter, November 8, 1958

ASTRONOMY

X-Rays From Sun, Found Source of Ionosphere

► **THE FIRST** proof that X-rays bombarding the earth's atmosphere to form certain layers of the ionosphere come from the sun's corona has been obtained by rocket studies made during a solar eclipse.

Dr. Herbert Friedman of the Naval Research Laboratory said the sun's X-ray emission continued undiminished during the eclipse, thus showing the radiation is emitted by the huge halo of glowing gas surrounding the sun's visible surface.

Dr. Friedman said the rocket studies opened up a new era of rocket astronomy, as important an advance as the use of photography was when it was introduced.

The measurements were made during the total eclipse on Oct. 12 by six Nike-Asp rockets fired during and after the event from the U.S.S. Point Defiance cruising near the Danger Islands group.

The eclipse expedition was part of the Navy's participation in the International Geophysical Year.

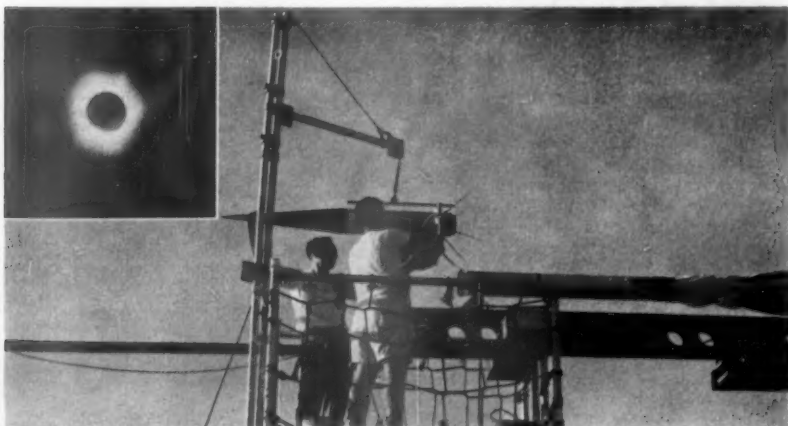
Five rockets were fired during the eclipse, two during totality. The sixth, launched the following day to get a background count of X-ray, ultraviolet and Lyman alpha radiation, was fortuitously aloft at the time of a solar flare.

The eclipse measurements showed that ultraviolet and Lyman alpha radiation disappeared almost directly in proportion to the geometric area of the solar disk exposed. This confirms that this radiation is emitted by the sun's visible surface or photosphere.

The flare measurements showed that Lyman alpha radiation is not increased by this tremendous activity of the sun, although previously it had been thought that Lyman alpha was responsible for the immediate effects of the ionosphere following flares, which result in blackouts of short-wave radio reception.

Solar activity is of particular interest during the IGY because of the vital part the sun plays in meteorology, oceanography and glaciology, as well as in ionospheric physics.

Science News Letter, November 8, 1958



TOTAL SOLAR ECLIPSE—U. S. Naval Research Laboratory scientists William A. Nichols (left) and J. J. Nemecek place the instrumented nose section of a rocket in position prior to its launching during the Oct. 12 solar eclipse. The sun is shown in the inset during the exact moment of total eclipse.

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MEDICINE

Health Problems in U. S.

Medical evidence points to the "American way of life" as an important factor in the high incidence of atherosclerosis, the number one killer among diseases in the United States.

► IT MAY be the "American way of life" that causes the high incidence of atherosclerosis in the United States, a doctor suggested.

Atherosclerosis is the number one killer in this country.

A comparison of the incidence of atherosclerosis found in the Negroes of Haiti and South Carolina revealed a ratio of two to one in favor of the Americans, Dr. Dale Groom of the Medical College of South Carolina reported at the American Heart Association meeting in San Francisco.

The American Negroes, both male and female at all age levels above 20 years, exhibited an incidence of hardening of the coronary arteries twice as great as Negroes in Haiti. This strongly suggests that environmental factors in the lives of the Americans raise their susceptibility to coronary disease, the scientist said.

Dietary differences do not seem to be the reason, as many researchers now are prone to suspect. Rather, it appears to be the stress of the American way of life.

Haitians habitually exercise more, mainly through hard physical labor. They also walk more than their American counterparts. Yet, most visitors to Haiti consider the inhabitants to be happier and more carefree, less concerned with the future or even the present.

Contrasted with this slow tempo is the more complex life of the Negro in the U. S., with its social tensions and mechanizations. It is more competitive, both socially and economically.

Dr. Groom said a widely prevalent view is that atherosclerosis is somehow linked to a person's diet and especially to the diet's fat content.

Yet, the incidence of hardening in the aorta, the main artery carrying blood from the heart to most parts of the body, was almost identical in both groups, he said.

If diet were influential as a cause of atherosclerosis, one would expect the conditions of the two types of arteries of both groups to be identical. Instead, the condition of one type of artery, the aorta, was the same for both groups while the coronaries of the two groups differed.

What then might be the explanation for the statistically significant difference seen in the levels of coronary disease among the two Negro groups? Since racial differences are more or less ruled out as an explanation, Dr. Groom and his colleagues tried to identify differences other than diet.

Other environmental differences that can be considered in this aorta-coronary discrepancy include climate, altitude, and the vastly greater prevalence of many infectious and parasitic diseases in Haiti. Working with Dr. Groom were Drs. Edward E. McKee,

Charles Webb and Faye W. Grant (now of Evanston, Ill.) of the Medical College, and Dr. Vergniaud Pean of the faculty of medicine, University of Haiti, Port-au-Prince.

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GENERAL SCIENCE

Name Nobel Winners

Three Americans won the Nobel Prize in Medicine for genetics research; three Russians won the physics award for radiation theory; an Englishman won the chemistry prize.

► NEW APPROACHES in genetics research, advancing man's understanding of the life process, won the 1958 Nobel Prize in Medicine for three American scientists.

Half the \$41,250 award went jointly to Drs. George Wells Beadle, 55, of the California Institute of Technology and Edward Lawrie Tatum, 48, of the Rockefeller Institute, New York, who until last year was at Stanford University.

The other half of the prize went to Dr. Joshua Lederberg, 33, currently chairman of the department of medical genetics, University of Wisconsin School of Medicine. Next April he will head a new department of genetics at Stanford University School of Medicine.

Drs. Beadle and Tatum established a new field now commonly called biochemical genetics. By ingenious biochemical methods, the two scientists devised a means of producing organisms with almost any predetermined biochemical specification.

The team was able to accomplish this effect by using the now famous "pink" bread mold, *Neurospora crassa*. The immediate result of their research in *Neurospora* genetics was the use of mold irradiation for wartime penicillin production. In addition, success with the technique led to the realization that genetics is related to definite chemical actions.

The *Neurospora* study has led scientists to the present-day chemical genetics approach to the study of DNA, deoxyribonucleic acid. Scientists believe that DNA, a giant molecule found in chromosomes, may be the substance that determines heredity and governs all cells and life itself.

Drs. Beadle and Tatum, who are now working separately, have both expressed the fear that radiation can cause serious

mutations in the genetic structure of cells.

Dr. Lederberg is well-known for his discovery that certain types of bacteria reproduce by fusing together rather than by the standard cell-division method. The genetic consequence of this discovery is the fact that among those individuals produced by this fusion process, some will contain gene combinations that are not found in either parent.

The scientist has more recently discovered that when a virus invades bacteria, it not only kills the bacteria, but also takes some of its genes. When the gene-containing virus is exposed to bacteria immunized against the virus, it is killed. However, the "swiped" gene is then "transduced" to the immunized bacteria.

In other words, the phenomenon is a substitute for a mating process. This research points to more simple methods of dissecting hitherto difficult bacteria for studies.

Drs. Tatum and Lederberg together in 1946 received acclaim for their discovery of bi-parental inheritance and sexual reproduction in bacteria strains.

► THE THREE Russian scientists who won the 1958 Nobel Prize in Physics discovered and developed the theories of the strange blue-white light known as Cerenkov radiation.

Cerenkov radiation is now used to detect high-speed particles, including discovery of the anti-proton in 1955, and also as a means of measuring the energy of these particles. First described by Nobelist P. A. Cerenkov in 1934, it is created when charged particles move through a transparent liquid or solid at a speed faster than that of light in the same material.

Drs. I. Frank and I. Tamm, who share this year's Nobel Prize with Dr. Cerenkov, developed the theory of the strange radiation's origin. Cerenkov radiation is often seen as a blue glow hovering over atomic reactors submerged in water.

It is, in effect, a kind of shock wave, similar to the shock wave produced by a bullet or airplane moving faster than sound. The wave front can also be likened to that formed by a boat moving through water, except that the wave picture becomes electromagnetic and also three-dimensional.

Cerenkov radiation is continuous, but the intensity is greater at shorter wavelengths. It issues forward along the line in which the charged particles are traveling, somewhat like the headlight beams of an automobile.

Although the existence of Cerenkov radiation might seem to contradict Einstein's theory of relativity, it does not. A basic postulate of Einstein's theory is that in a vacuum the speed of light would be constant and the "fastest" thing in the universe.

In liquids and other mediums of light propagation, however, it is well-known that the speed of light is less than the ideal postulate of Einstein's. Thus it is strange but not remarkable that the particles can race through the materials faster than can light rays.

► THE FIRST scientist to determine the structure of a protein has been awarded the 1958 Nobel Prize in Chemistry. He is Dr. Frederick Sanger of Cambridge University, England.

Dr. Sanger, who has been studying the hormone insulin for the past 12 years, determined its structure in 1955 when he found that one molecule of insulin contained 777 atoms. The discovery was extremely useful in the analysis of other proteins.

Dr. Sanger's work began at a time when the molecular weight of insulin was believed to be about 12,000. It is now known, by ultracentrifuge and diffusion methods, that its molecular weight is approximately 40,000.

The positions of the amino acids, glycine and phenylalanine, in the insulin molecule were discovered by Dr. Sanger. Largely through his efforts, the structural detail of insulin is known with considerable certainty. No other protein molecule of comparable size is so well-understood as far as structure goes.

Married and the father of two boys, Dr. Sanger has for the last seven years been on the staff of the British Medical Research Council. He was awarded the Corday-Morgan Medal and Prize of the Chemical Society in 1951.

Science News Letter, November 8, 1958



PRIZE WINNERS IN MEDICINE—Nobel winners are, left to right, Drs. George W. Beadle, California Institute of Technology; Joshua Lederberg, University of Wisconsin, and Edward L. Tatum, Rockefeller Institute.

● RADIO

Saturday, Nov. 15, 1958, 1:35-1:45 p.m. EST "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. Alexander Gode, chief of the Interlingua Division of Science Service in New York, will discuss "Progress in International Auxiliary Language."

ZOOLOGY

Porpoise Has "Sonar"

► DROP a half-teaspoonful of water from a height of five or six feet into a pool of water and if there is a porpoise swimming around he probably will hear it.

The porpoise is supersensitive to sound, Dr. W. N. Kellogg reports in *Science* (Oct. 24).

It is known to react to sound of 80 kilocycles per second, two full octaves above the upper frequency threshold for hearing in man. The animal actually might be said to possess an echo-ranging or a sonar system, Dr. Kellogg, professor of experimental psychology at Florida State University, explains.

Now, for the first time, he reports, the ability of the porpoise to detect objects by means of reflected sound has been demonstrated.

That porpoises make sounds has been known for many years. Experiments show they make occasional exploratory bursts of sound pulses. These "auditory glances" enable the porpoise to detect and even distinguish between objects in the water. Streamlined objects silently inserted into the water were also detected, as were invisible objects such as sheets of Plexiglas and glass.

A splash may alert a porpoise that some-

thing is entering the water. The animal immediately lets loose with a "torrent of sputtering sound pulses."

Without the splash, Dr. Kellogg reports, there is a delay of only ten to 15 seconds before the object is "seen" as a result of the random auditory glances.

Sight, smell, temperature or touch were ruled out by the scientist and his colleagues as possible aids to detecting food, etc.

In a series of experiments they established that the porpoise uses its sonar system to avoid colliding with underwater objects and that its performance improves after several trials until there are no collisions.

Apparently learning takes place, Dr. Kellogg reports.

The porpoise distinguished between two fish, the preferred food fish being about one-half the size of the nonpreferred fish. Also, in 202 trials, the porpoise made no attempt to get at a fish behind a glass barrier. During the experiment in which there were two fish offered, both visible but one behind the glass, the porpoise "sputtered intermittently," listening for the right fish to get.

Science News Letter, November 8, 1958

ASTRONAUTICS

Predict Space Man Soon

► A MAN could be orbiting the earth in a space capsule by 1960 if the Government would back the program with an estimated hundred million dollars.

Dr. Arthur Kantrowitz, director of the AVCO Research Laboratory, Everett, Mass., said the ideal candidate for the first space pilot would be a "little physician." It would be easier to teach him the necessary engineering and physics than to teach an engineer the required medical knowledge.

Dr. Kantrowitz's plan calls for sending about half a dozen 1,000-pound capsules containing animals, probably monkeys, in earth-circling orbits before man makes the attempt. The vehicles would be completely controlled from earth, so that the animals and the first man in space could be brought back alive, even if he were unconscious due to weightlessness or other unforeseen conditions.

The space capsules would be designed to circle several days in the so-called "orbit of decision," at altitudes from 100 to 120 miles above the earth's surface.

Launching a man into space can be accomplished with presently available booster rockets, Dr. Kantrowitz said. Many of the engineering problems involved in putting up a manned satellite, including more precise guidance systems, have already been solved in connection with the ICBM program.

Dr. Kantrowitz urged starting the program immediately, pointing out that a manned space laboratory would lead to more rapid progress in exploring beyond

the earth's atmosphere than unmanned, automated space vehicles.

The first step would be the 1,000-pound capsules for animals, followed by a 1,400-pound satellite for a man, preferably a physician weighing about 150 pounds. The orbiting space laboratory would closely follow these developments.

One advantage of the relatively low-altitude orbit chosen by Dr. Kantrowitz is that even the rarefied atmosphere at the 100-to-120-mile level can be used for orienting the satellite and to help start its recovery. It is also possible to take off from this level for more extended space flights by applying small amounts of thrust.

The term "orbit of decision" is thus applied because it will be possible from there to return to earth, to remain in orbit or to set off into space.

Dr. Kantrowitz outlined his manned space program at the University of Maryland's Space Research and Technology Institute.

Science News Letter, November 8, 1958

PSYCHOLOGY

Small Doses of Alcohol Affect Driving Skills

► IF YOU are an extrovert, chances are you had better not have an alcoholic drink if you are going to drive, not even a small one.

The extroverts among a group of 40 volunteers had an average increase of 23% in errors in driving performance made under

the influence of alcohol. Introverts had an increase of only six percent. All volunteers' performances were evaluated on a driving training apparatus before and after drinking various amounts of absolute alcohol.

Experiments designed to test the effect of small doses of alcohol on a "skill resembling driving" show that several factors, including personality, have to be considered. However, on the whole, driving ability begins to deteriorate with very low blood alcohol concentrations, a group of researchers reports in the *British Medical Journal* (Oct. 25).

Although the National Safety Council of America recommends concentrations of 100 milligrams (mg) per 100 milliliters (ml) of blood as the "safe" limit, the scientists found performance begins to deteriorate with as little as 20 to 30 mg per 100 ml of blood. In fact, there is no threshold effect. As soon as there is a measurable amount of alcohol in the blood there is also a measurable increase in error.

In carrying out the experiment, the scientists also found that of three breath analysis instruments tests, the "alcometer," the "drunkometer" and the "breathalyzer," the last proved to be the most reliable. Also, they reported no change in average speed as a result of drinking itself; there were individual variations, however.

Age, sex, previous driving experience and previous drinking habits appeared to be unrelated to individual responses to alcohol.

G. C. Drew, Dr. W. P. Colquhoun and Hazel A. Long, department of psychology, University of Bristol, carried out the experiment on behalf of a joint committee appointed by the Medical Research Council and the Road Research Board.

Science News Letter, November 8, 1958

ZOOLOGY

Mice, Shrews Select Food By Instinct and Learning

► SOME SMALL mammals can not only tell if the insect food they dig up is edible or not, they can also detect if it is male or female, sick or healthy.

There is evidence that both instinct and learned behavior play a role in the way shrews and deer mice select their food, C. S. Holling of the Forest Insect Laboratory, Sault Ste. Marie, Ontario, has found. Apparently, the mammals locate food, sawfly cocoons in this experiment, by sense of smell.

Afterwards, in the eating phase, taste stimuli take over. There seem to be innate likes and dislikes as far as taste goes, the scientist reports in the *Canadian Journal of Zoology* (Oct.), but none associated with the odor stimuli. The animals had to learn by experience what odors were associated with particular cocoon contents.

Larger animals also selected more female cocoons, which are larger than the male. Although fungus-infected cocoons were dug up and some were opened, the animals never ate a diseased insect.

This research may support theories that small mammals are important predators of insects that spend part of their life in the ground.

Science News Letter, November 8, 1958

GENERAL SCIENCE

Science: World Solution

▶ A NEW APPROACH to international problems—entrusting scientific experts with finding solutions in limited, specified areas—is urged by the editor of the *Bulletin of the Atomic Scientists* (Oct.).

Dr. Eugene Rabinowitch of the University of Illinois said success of scientists at the Geneva conference in agreeing on methods of monitoring any future atomic or hydrogen bomb test ban pointed the way to this new approach. It would be based on the "supremacy of the common interests of mankind over specific political and strategic interests of individual nations or groups of nations."

The mutual problems of nations could be broken into "technically significant packages," Dr. Rabinowitch recommends, and the solution of each then assigned to scientific experts from the countries involved. Once an international problem has been formulated in scientifically significant terms, scientists from all countries should be able to find a common language and arrive at an agreed solution, despite their different political or ideological backgrounds. They did this in Geneva for detecting nuclear weapons explosions.

Whether the nations of the world are ready to accept such an approach is not known. It may be a "more radical innovation" than the leaders of the major nations are willing to undertake, despite the disastrous experience of traditional diplomacy in the last ten years.

Nevertheless, Dr. Rabinowitch argues, "no essential progress toward world security can now be made without adopting an entirely new approach to international problems."

He urges assignment of a "key role in the

search for a way out of the deadlock to the [relatively] objective scientific and technological experts."

Dr. Rabinowitch bases his recommendations on the assumptions that the ultimate aims of all nations are ending the arms race and achieving maximum security from the outbreak of an unwanted war at every stage of this process.

His approach to the fundamental problems of the arms race and world security uses the criterion of what is technically the most feasible means to a common aim, instead of what satisfies national interests.

Science News Letter, November 8, 1958

ASTRONAUTICS

Draw Plans for First Moon Building

▶ PLANS HAVE been drawn for the first permanent building on the moon.

The proposed moon building will have living quarters for moon explorers and space pilots, laboratories for scientific research, maintenance shops for space vehicles and stations for earth-moon communications. It would be a cigar-shaped corrugated metal cylinder covered by a protective metal "meteorite shield."

The moon building was designed and engineered by the Wonder Building Corporation of America, Chicago, under the technical direction of Dr. John S. Rinehart, director of the Mining Research Laboratory of the Colorado School of Mines and former associate director of the Smithsonian Astrophysical Observatory, Cambridge, Mass.

Dr. Rinehart said that because of the

present lack of knowledge and great divergence of opinion concerning the moon's surface, the moon building was designed for the worst condition anticipated. This would be a sea of dust upon which the building would float, anchored by heavy weights suspended by cables from the structure. If the moon's surface proves to be sufficiently solid, it could then provide normal support.

If built to Dr. Rinehart's specifications, the moon building would be 340 feet long, 160 feet wide and 65 feet high. An air lock and plastic observation bubble would make it 520 feet long. It would be made of aluminum alloys that combine high strength and low weight with ease of fabrication. Aluminum also provides a good reflecting surface to aid in the cooling problem.

Above and separated from the roof would be a slightly curved, umbrella-shaped meteorite shield to protect the building from the unceasing rain of interplanetary dust.

Any building constructed on the moon, Dr. Rinehart noted, must be internally pressurized with an atmosphere in which humans can survive since the moon has no atmospheric pressure. It must also be able to withstand extreme temperature changes, ranging from 214 degrees Fahrenheit at lunar midday to 243 degrees below zero Fahrenheit at lunar midnight.

Science News Letter, November 8, 1958

METALLURGY

New Titanium Alloy Withstands High Heats

▶ A NEW titanium alloy, which exhibits strength properties exceeding most steels, can withstand extremely high temperatures during long periods of time.

The alloy has long-time strength properties at 1,100 degrees Fahrenheit and short-time strength properties up to 1,500 degrees Fahrenheit.

Named MST 881, it was developed by Mallory-Sharon Metals Corporation of Niles, Ohio. The designation was arrived at from the percentages of its alloying elements; eight percent aluminum, eight percent zirconium, and one percent tantalum and columbium combined.

The new alloy is expected to expand the use of titanium in construction of Mach 3 jet engines, missiles, and in manned aircraft. Current titanium alloys lose strengths rapidly at prolonged temperatures of more than 800 degrees Fahrenheit.

Science News Letter, November 8, 1958

ENGINEERING

Machine Automatically Tests Missile Mechanism

▶ A MACHINE tests in minutes whether the electrical, hydraulic and pneumatic systems of guided missiles and airplanes are ready for take-off.

ASCAT, which means analog self-checking automatic tester, developed by Bell Aircraft Corporation, allows one technician to do in two minutes the operations that formerly required a crew of ten working more than an hour.

Science News Letter, November 8, 1958



MOON HOUSE—A detailed five-by-six-foot scale model of the moon building designed and engineered under the direction of Dr. John S. Rinehart shows the plastic observation bubble and the slightly curved meteorite shield above the roof. It would be constructed of aluminum alloys.

PUBLIC HEALTH

Health Hazards Noted In Rocket Propulsion

► **FUEL TOXICITY**, extreme noise and acceleration, and the difficulty in providing for passenger comfort are among the major hazards of rocket propulsion.

Louis Michelson, manager of the Rocket Engines division of the General Electric Company, Cincinnati, described these hazards at the American Public Health Association meeting in St. Louis, Mo.

Concentrated hydrogen peroxide, one of the earliest high energy fuels, was soon found to react rapidly with skin tissue, he said. Similarly, nitric acid fumes cause irritation of the nose and throat tissues, and hydrazine is highly poisonous. Both of these are common propellants on upper stages of lunar rockets. Therefore, he said rubberized, splash-proof and vapor-proof clothing must be worn in handling these fuels during their production, loading and burning.

Such fuels as the boron hydrides are rich in low-molecular-weight hydrogen and make excellent fuels but are highly toxic.

Rocket fuels are not the only poisonous rocket components. Many of the metals used in their construction are also toxic. For instance, one of the most ideal metals for rocket use because of its strength at high temperatures is beryllium. Unfortunately, the oxides of beryllium are highly toxic.

Another major hazard of high speed propulsion is the extreme noise associated with propulsion. The noise from a rocket motor at a distance of 1,000 feet and operating at a 30,000-pound thrust can reach the point where it becomes painful to the ear. Engines with 1,000,000 pounds of thrust will be so noisy that it will be impossible to approach within 3,000 feet without ear protection while the engine is being run.

Acceleration would also be a hazard to any rocket passenger. Since most rockets have a constant level of engine thrust and become lighter as fuel is consumed, the same amount of thrust produces greater and greater accelerations. It is expected that a man being sent aloft in a rocket will have to be protected sufficiently to be able to withstand accelerations as high as eight to ten times the force of gravity for up to two minutes.

Science News Letter, November 8, 1958

SURGERY

Heart Valve Remodeled To Overcome Leaking

► **MAKING** A two-cusped valve out of the three-cusped aortic valve may be the solution to a serious heart defect.

Normally, the valve has three leaves or cusps that come together during the "filling stage" of the heart cycle and thus block any backward flow of blood into the heart from the aorta. Sometimes, however, as in the case of some inherited defect or rheumatic heart disease, one of the cusps may become defective. This means a break in the perfect closing of the valve and blood leakage back into the heart.

Now, Dr. Charles P. Bailey, a Philadel-

phia surgeon, reported to the American Heart Association meeting in San Francisco, there are several methods being used to change the valve closing to a bicuspid, or two-leaved, one.

Among the methods are stitching two of the three cusps together, lifting flaps of tissue from the aorta lining and joining them to the free edges of the deformed cusps, and removing a cusp along with a part of the aorta lining.

"Each case must be individualized," Dr. Bailey concluded, "in order to achieve the greatest possible correction of the leak with the least possible narrowing of the passage-way."

Science News Letter, November 8, 1958

PALEONTOLOGY

Rich Fossil Field Found In Argentine Valley

► **PURPLE BONES** promise to make a remote region of Argentina one of the world's richest fossil collecting areas.

The fossil field, about 12 miles long, contains bones of reptiles that roamed the earth some 170 million years ago, prior to the dinosaurs. The valley is mostly shale and clay, colored gray with pink, blue, green and yellow areas.

Much of the rock containing the fossils has been weathered and portions of the bones protrude. The exposed parts are covered with a purple matrix containing an iron compound. The bones are easily seen against the lighter background of rock and some lie loose on the ground.

A five-ton shipment of blocks of fossil reptiles collected at the site last spring has been received by Harvard University's Museum of Comparative Zoology. The specimens are still encased in rock and their preparation and study and display will take years to complete.

Several specimens belong to a type of reptiles, known as Cynodonts, that have features in common with mammals. These have been described as resembling crosses between lizards and dogs. Whether they nursed their young or had hair, as do mammals, is unknown. However, some anatomical characteristics lead paleontologists to believe they were warm-blooded like birds and mammals.

The uninhabited valley is near Ischigualasto in west central Argentina near the border between the provinces of San Juan and La Rioja.

Why so much fossil material occurs there is unknown. Fossils of land animals of the same general age have been found previously only in east Africa and southern Brazil, and these specimens are in much poorer condition.

Members of the expedition, including Profs. Alfred S. Romer and Bryan Patterson of the Museum, were unaware of the fossil richness at Ischigualasto before leaving Cambridge. They had been working in the Mendoza region along the eastern edge of the Andes, and went to the valley because small finds had been reported there years before.

Science News Letter, November 8, 1958

IN SCIENCE

SURGERY

"Walking" May Prevent Clots During Surgery

► **ELECTRICAL** stimulation that will keep patients "walking" during surgery may prevent blood clot formation.

When movement of the leg muscles is reduced, as during surgery, the blood pools in the legs and conditions are set for the formation of blood clots.

When the patient is "walking" through the use of electrical stimulation of the leg calf muscles, this pooling is reduced. The stimulation causes the muscles to contract as they do in walking and to act as a pump, forcing the blood back to the heart. Drs. John and Angus D. McLachlin of the department of surgery at the University of Western Ontario Faculty of Medicine, London, Ont., report in the *Archives of Surgery* (Oct.)

The doctors applied skin electrodes, similar to those used to study the heart's electrical activity, on the legs of patients. The closed electrical circuit produces regular contractions of the calf muscles during the operation and until the patient is able to move about.

Blood pooling in the legs may be a prime factor in pulmonary embolism, the doctors suggested. Therefore, prevention of pooling may lessen the possibility of clot formation.

When blood clots form, parts of them may break off and move through the vessels. They can block the artery between the heart and lungs, forcing the blood back to the heart. This condition, known as pulmonary embolism, is now the commonest single cause of death following major surgery.

Science News Letter, November 8, 1958

VITAL STATISTICS

Children Taller, Heavier In U. S. and Other Nations

► **A WORLD WAR** and economic depression have not kept children today from being taller and heavier than their parents were.

Among boys nine years and older the increase in height is an inch or more, the Metropolitan Life Insurance Company, New York, reports. Increases in weight range from two pounds at age seven to 13 pounds at age 14.

There is evidence that these figures, taken from a study of Michigan school children in 1937-39 and in 1954, are also representative of the United States as a whole. Other nations are reporting similar increases.

Improved nutrition, rising living standards and the decreased number of debilitating diseases among children are among the factors that are responsible for the children's improved physical status, the insurance company researchers said.

Science News Letter, November 8, 1958

CE FIELDS

FISHERIES

Shellfish, Baby Herring Attracted by Lights

► CRABS AND lobsters not only "like" bright lights, they apparently prefer blue or green light to any other color.

This discovery may help the U. S. fishing industry bring in one of its biggest shellfish catches. By using lights mounted on the base of a fish net and directed to its mouth, Japanese fishermen have already more than doubled their catch, J. Pileggi of the Bureau of Commercial Fisheries reported.

While the Japanese have been testing the effects of lights in attracting shellfish, scientists along the Scottish coast have been experimenting with light's effects on herring and whiting.

They found that whiting, young herring and sprats, a kind of small herring, were most susceptible to the use of lights. Adult herring, however, exhibited a negative reaction to the lights at all times and, the scientists report, there is no evidence that lights made the maturing fish collect in one place.

Since the lights attracted both marketable and unmarketable sizes of whiting, special fishing equipment would have to be used with the lights in order to sort out the "good" from the "bad" fish. This means that lights as an aid for commercial fisheries would be useful only where juvenile herring and sprats were desired, the scientists explained.

Fish attracted by lights seemed to dislike light coming from below them. They collected below the lights except in one instance when two lights were used at different depths.

The lights indirectly attracted predator fish, also, the scientists said. These fish—mackerel, dogfish, cod and some whiting—were attracted by the easily available prey. In one case, the scientists reported, an entire shoal of sprats attracted by lights was virtually destroyed in 15 minutes by mackerel.

J. H. S. Blaxter and B. B. Parrish reported their research in the Scottish Home Department's marine research series.

Science News Letter, November 8, 1958

MINERALOGY

New Compounds Formed 60 Miles Deep in Earth

► MINERALS CONTAINED in the earth's abundant granite and basalt deposits are changed into new compounds at depths of less than 60 miles beneath the surface.

The transformations occur in much the same way that graphite is changed to diamond under great pressure, Dr. George C. Kennedy of the University of California at Los Angeles reported in a Sigm Xi national lecture at the University of Miami Sigma Xi Club, Coral Gables, Fla.

Quartz, albite feldspar and orthoclase feldspar, which are the common minerals of granite, are transformed at different pressures. Quartz, for instance, changes into coesite at 500 degrees centigrade and 19,000 atmospheres of pressure. (One atmosphere is approximately equal to 14.7 pounds per square inch.) This pressure is equivalent to a depth in the earth of about 40 miles. Albite feldspar breaks down into both jade and quartz at a pressure of about 13,000 atmospheres at 500 degrees centigrade.

The common minerals of basalt—pyroxenes, amphiboles and calcium-sodium feldspar—are transformed in a similar way but at even lower pressures.

Science News Letter, November 8, 1958

ENGINEERING

Teletypewriter Prints 3,000 Words a Minute

► A TELETYPewriter can print 3,000 words a minute, 20 times faster than most people can talk. It prints 45 times faster than an average typist.

Operating at 750 words a minute for U. S. Army Signal Corps needs, it will do the work of eight military printers now in use and get completed messages to their destinations eight times faster.

Instead of using ordinary keys, as do conventional teletypewriters, the machine shoots letters at the paper with a series of electrode "guns." Each gun aims a beam at a corresponding spot on the paper and can fire any letter or number.

After the letters have been fired, each line of text passes rapidly over powdered ink and a heated roller and appears a split second later as clear, readable text. The device operates from standard code tape, or can be plugged into long-distance radio or telephone circuits.

The machine is expected to be the basic unit in what the Army believes will be the fastest known military teletypewriter network.

It will also have broad civilian applications by providing greatly increased message speed for weather forecasting networks, stock exchanges, telegraph offices and news gathering agencies.

Another use will be typing out calculations of new military electronic computers, which handle data so fast that none of today's standard page printers can keep up with them.

Even at speeds printing four lines of text a second the new device is said to be operating in low gear. With further development, its theoretical top speed is expected to be 500,000 words a minute, or the equivalent of three full-length novels.

In mass production, the printer will probably cost half as much as the eight standard printers it can replace.

The device, a joint development by the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N. J., and the Burroughs Corporation, Paoli, Pa., was displayed at the Overseas Press Club in New York.

Science News Letter, November 8, 1958

NEUROLOGY

Microscopic Damage Causes Several Ills

► WHEN MICROSCOPIC areas in the brains of experimental animals are damaged, sex deviation, obesity and epilepsy occur.

This has been demonstrated in research by Dr. John D. Green and associates at the University of California at Los Angeles Medical School.

While all the brain damage occurred in a region of the cerebrum known as the rhinencephalon, each type of abnormal behavior was associated with damage to a particular subdivision of the rhinencephalon.

Sex deviation was observed in male cats which had damage in the piriform cortex area of the rhinencephalon. The deviation took the form of an abnormal sex drive which was directed not only toward female cats but other animals and inanimate objects.

Animals having damage in the basal and lateral part of the brain region known as the amygdala demonstrated voracious appetites and became abnormally fat. Epileptic seizures occurred in cats with damage to the hippocampus.

Dr. Green said it was not known whether the relationship of brain damage to abnormal behavior in experimental animals applied to human beings or not, but that similar effects have been observed after brain surgery in the same areas. Brain damage leading to epileptic seizures in the animals is similar to that observed in some human epileptics, and it is possible that certain types of sex deviation and obesity in humans may be related to brain damage.

The research, which has been reported in the *Journal of Comparative Neurology*, has been supported by the U. S. Public Health Service.

Science News Letter, November 8, 1958

BOTANY

Short Days Cause Legumes' Iron Deficiency

► "IRON DEFICIENCY" may be the reason why some legumes, a family of important food plants such as peas and alfalfa, fail to grow well.

A general hematin deficiency was found in several leguminous plants when they were grown under short-day conditions, C. Sironval of the department of biochemistry, Cambridge University, reports.

He notes that soya beans and lupin grown under eight hours of daylight had 20% to 30% less hematin in the leaves. With lupin, some root nodules had 50% less hematin. There was also a reduction in the chlorophyll content, the scientist reports in *Nature* (Oct. 25).

However, in hemp, which needs a short day to flower, the hematin content increases in short day-length while chlorophyll content decreases.

Hematin is a complex pigment made up of iron plus porphyrin, a nitrogen compound. Together with the protein globin, hematin makes up hemoglobin.

Science News Letter, November 8, 1958

MEDICINE

Progress in Cancer Fight

Breakthrough in the cancer fight is seen from two avenues of approach, the virus theory and the development of chemicals that inhibit growth or destroy cancer cells

See Front Cover

By ANN EWING

► **PROGRESS** in the fight against cancer is slow but sure.

The laboratory war to beat this silent invader of the body is being waged along two main avenues of attack.

One is on the theory that a virus or viruses cause cancer. If confirmed, this could lead to a vaccine protection somewhat like vaccines against the polio virus. Some virus-like particles have actually been found in and around cells taken from cancer patients.

The other is aimed at finding chemical compounds that will inhibit the growth of cancer cells or destroy them completely.

The photograph on the cover of this week's *SCIENCE NEWS LETTER* shows a section of a model of the important molecule, DNA, which is believed to be basic to all life. Construction of the model is significant since it indicates that the chemical components and their arrangement are known.

Some experts foresee a breakthrough in research within ten, or possibly, five years, and thus an eventual cure for one or more kinds of cancer not now curable. Others believe that progress will be much slower.

But virtually everyone agrees that each year more and more persons will join the 800,000 Americans who have been cured of the disease.

Half Might Be Saved

Cancer is the second leading cause of death, now claiming about 250,000 lives annually. Unless new treatments and cures are found, one out of every four Americans now living will have some form of cancer during his lifetime.

This tragic waste could be reduced. Specialists estimate that one-half the patients with cancer could be alive and free of disease five years after treatment if the most modern methods of early diagnosis and proper care were available to everyone. The other 50% could not be cured by available methods and it is for this group that the most urgent attempts are being made to devise or discover effective chemical treatments.

The organizations most active in supporting this and other cancer research include the National Cancer Institute of the National Institutes of Health, the American Cancer Society, the Damon Runyon Memorial Fund for Cancer Research, the Sloan-Kettering Institute for Cancer Re-

search in New York and the Children's Hospital in Boston.

One of the most frequently asked questions today is, "Does smoking cause cancer?" Although a definite "Yes" or "No" answer still cannot be given, statisticians working for the American Cancer Society, who have studied death rates and smoking habits, suggest that there is a causal relationship. Among 187,783 men whose medical history was traced for an average of 44 months, the risk of developing lung cancer was at least ten times as great among smokers as non-smokers.

The men who smoked two or more packs of cigarettes per day had an age standardized death rate for lung cancer higher than the age standardized death rate in non-smokers for all forms of cancer combined. The statistics also showed that the death rate due to coronary artery disease increased directly with the number of cigarettes smoked.

Tobacco companies do not agree. They hold that statistics do not prove a causal relationship between smoking and cancer,

that the positive association shown might be expected to appear because of the manner in which the studies are made.

It has been demonstrated, however, that condensed cigarette tar obtained in a manner simulating human smoking habits can produce skin cancer in mice when painted on their skins. Most of the cancer-causing compounds are contained in a small percentage of the total tar.

Chemicals produced by gasoline combustion and by some industrial processes are also suspected as a contributing factor in lung cancer. (See *SNL*, July 26, p. 54.)

Research to confirm the theory that a virus or viruses cause cancer or are influential in its development is underway at many laboratories around the world. Not only have particles resembling viruses been found in cells of cancer patients, but a strain of mouse leukemia produced by a viral agent has been developed.

In other studies, cell-free filtrates from the brains of acute leukemia victims have been found to contain a substance that accelerated the development of leukemia in a strain of mice inclined to develop this disease. Identification of this accelerating factor may be a clue to the cause of leukemia in man.

The paradox that many chemicals or other factors that seem to start cancer will



MILLIONS OF CELLS—At the Bio-Chemical Virus Laboratory of the University of California, Dr. Wendell M. Stanley, head of the lab and 1936 Nobel Prize winner in chemistry, holds a culture bottle containing more than 10,000,000 living cells.

sometimes have a remissive effect on growing tumors seems to apply to viruses. Some viruses under certain conditions, for instance, will halt or prevent cancer growth.

That the body possesses some natural defenses against cancer was shown by a series of investigations made with volunteers from Ohio State Penitentiary who received injections of live cancer cells. (See SNL, July 26, p. 62.)

The intensive search for chemical agents of value against cancer has led to several classes of drugs that have some temporary growth-restraining action on some types of cancer in man.

One group is related to the nitrogen mustards, and more than 40 compounds of this type have been tested in man.

Another group is the antimetabolites, which can be divided into several categories. The antifolics, the purine analogues such as 6-mercaptopurine and the glutamine antagonists such as azaserine each have a distinctive method of action, and one type may work when the other is no longer effective.

Sex hormones, including the female hormones, or estrogens, and the male hormones, or androgens, and the adrenal steroids such as cortisone, have also been found effective in controlling or regressing cancer growth.

Among the other miscellaneous compounds that have been found effective are antibiotics such as actinomycin, and other drugs such as colchicine and urethane that do not fit into an established category.

Even with new drugs, however, the best way to treat cancer is likely always to be by catching it at the earliest possible moment, before it has had a chance to spread.

Projects to develop the application of the cytologic test (by which cancer is spotted from examination of the cells normally discarded by the body) for the diagnosis of cancer in other parts of the body are being supported by the National Cancer Institute.

An antigen, or substance that causes the formation of antibodies, has been isolated and purified, and was found to be a common component of many types of cancer. If this proves to be a consistent point of immunological difference between normal and cancer cells, the way could be opened for development of a general cancer diagnostic test.

There is now considerable evidence that during surgical removal of a localized cancer, malignant cells may spill into the blood vessels or lymphatic system. This is known as metastasis. The scattered cells may set up secondary growths, thus frustrating the successful removal of the local tumor.

On the basis of animal studies, it has been proposed to treat patients immediately after surgery with injections of nitrogen mustard or one of its relatives in an effort to destroy any scattered cells before they become firmly established as resistant secondary growths.

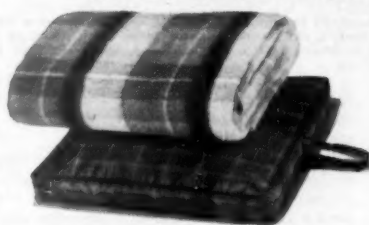
Radiation therapy for the treatment of cancer more and more involves the use of super-voltages, since in some instances results superior to those obtained with lower voltage X-ray therapy are obtained.

Radiocactive isotopes are also widely used in cancer therapy.

Science News Letter, November 8, 1958

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THE ACADEMIC MARKETPLACE—Theodore Caplow and Reece J. McGee, foreword by Jacques Barzun—*Basic Bk*, 262 p., \$4.95. Of interest to scientists who are teaching.

THE AGE OF REPTILES: Life in Prehistoric Times—Dorothy E. Shuttlesworth—*Garden City Bk*, 57 p., illus. by Matthew Kalmenoff, \$2.50. Introduces young reader to the world of the dinosaurs.

AIRMEN AND WHAT THEY DO—Charles I. Coombs—*Watts, F.*, 192 p., \$3. On aviation careers and opportunities.

THE AMA NEWS, Vol. 1, No. 1—Jim Reed, Ed.—*Am. Medical Assn.*, 16 p., illus., paper, bi-weekly, \$3 per year. Non-technical newspaper for physicians featuring news in the medico-economic and socio-economic fields.

AMERICAN INDUSTRY'S SCIENTIFIC-TECHNICAL EXECUTIVE (STE) NEEDS: A Report—Hoff, Canny, Bowen & Assoc., 14 p., illus., paper, free upon request direct to publisher, 405 Lexington Ave., New York 17, N. Y. A study of the practices of 612 leading U. S. industrial corporations in the field of STE personnel.

THE ANCIENT NEAR EAST: An Anthology of Texts and Pictures—James B. Pritchard, Ed.—*Princeton Univ. Press*, 350 p., illus., \$6. A selection of ancient Near Eastern documents important for an understanding of biblical peoples.

ANCIENT SEMITIC CIVILIZATIONS—Sabatino Moscati—*Putnam*, 254 p., illus., \$5. Outline of

the forms of civilizations and the distinctive common traits of the peoples who spoke the semitic languages.

ANDY'S WONDERFUL TELESCOPE—G. Warren Schloat, Jr.—*Scribner*, 48 p., photographs, \$2.75. Explains in pictures step by step what a young person can observe through the telescope.

ANIMALS IN INDIA—Ylla—*Harper*, 132 p., photographs by author, \$10. A spectacular view of the fauna of India.

ARCHAEOLOGY AND THE OLD TESTAMENT—James B. Pritchard—*Princeton Univ. Press*, 263 p., illus., \$5. For the layman a review of the biblical past which archaeologists have discovered in the last hundred years.

ARCTIC WILD—Lois Crisler—*Harper*, 301 p., illus., \$4.95. Of life in the Arctic in winter and spring, photographing wolves and caribou.

CAREERS FOR THE CHEMICAL ENGINEER—M. Brewster Barton, Ed.—*Careers Inc.*, 48 p., illus., paper, \$1. Leading employers highlight job opportunities for qualified young men.

THE FIRST BOOK OF AIRPLANES—Jeanne Bendick—*Watts, F.*, 64 p., illus. by author, \$1.95. Acquaints the child with the principles and mechanics of flight.

HANDBOOK OF CHEMISTRY AND PHYSICS: A Ready Reference Book of Chemical and Physical Data—Charles D. Hodgman, Robert C. Weast and Samuel M. Selby, Eds.—*Chemical Rubber Pub. Co.*, 40th ed., 3456 p., \$12. More than 100 pages of new and revised scientific facts added.

HOW TO RAISE YOUR CHILD'S IQ—David Engler—*Criterion Bk*, 153 p., illus., \$3.50. A New York City teacher tells how he believes parents can help their children improve their scores by a few points.

LIFELINE: The Story of Your Circulatory System—Leo Schneider—*Harcourt*, 127 p., illus.

by Jere Donovan, \$2.95. Tells in simple language what blood is made of, how it circulates and functions.

THE MARCH OF ARCHAEOLOGY—C. W. Ceram, transl. from the German by Richard and Clara Winston—*Knopf*, 332 p., illus., \$15. A pictorial history of archaeology, of excavations and their interpretations.

MINERALS YEARBOOK 1956, Vol. I: Metals and Minerals (Except Fuels)—Staff, Bureau of Mines, Division of Minerals—*Govt. Printing Office*, 1409 p., \$4.50. Based largely on data provided by the mineral industries.

MODERN MATERIALS: Advances in Development and Applications, Vol. I—Henry H. Hausner, Ed.—*Academic*, 402 p., illus., \$12.50. For the engineer, student, research and development specialist.

THE NEGRO PERSONALITY: A Rigorous Investigation of the Effects of Culture—Bertram P. Karon, foreword by Silvan S. Tomkins—*Springer Pub.*, 184 p., illus., \$4.50. Inquiry into what it feels like to live as a member of a caste in an otherwise democratic society.

NEUROTIC DISTORTION OF THE CREATIVE PROCESS—Lawrence S. Kubie—*Univ. of Kansas Press*, 151 p., \$3. A technical study of Man's symbolic processes, the instrument both of his creativity and of his psychological illnesses.

PASTEUR AND THE INVISIBLE GIANTS—Edward F. Dolan, Jr.—*Dodd*, 214 p., \$3. Biography for teen-agers.

PLANTS OF WOODLAND AND WAYSIDE—Su Zan Noguchi Swain—*Garden City Bks*, 57 p., illus. by author, \$2.95. To introduce beginners to the world of plants.

REPORTS FOR SCIENCE AND INDUSTRY—Margaret D. Blicke and Kenneth W. Houpp—*Holt*, 230 p., \$4.75. Textbook for beginning and advanced students.

THE SEA AROUND US—Rachel Carson, adapted by Anne Terry White—*Simon & Schuster*, 165 p., 150 photographs, maps and drawings, \$4.95. Special edition for the younger reader.

SEE UP THE MOUNTAIN—Betty Morrow with Millicent E. Selsam—*Harper*, 48 p., illus. by Winifred Lubell, \$2.50. Takes young reader through the changes in flora and fauna up a mountain.

700 SCIENCE EXPERIMENTS FOR EVERYONE—UNESCO, foreword by George Wendt—*Double-day*, 223 p., illus., \$3. Safe, exciting experiments for beginners, originally compiled by an international board of science experts as the UNESCO SOURCE BOOK FOR SCIENCE TEACHING.

SPACE TRAVEL—William M. Hutchinson and Kurt Spielberg—*Maxton Publishers*, 28 p., illus., 69¢. A short introduction to space projects for young people.

UNDERSTANDING TIME: The Science of Clocks and Calendars—Beulah Tannenbaum and Myra Stillman—*Whitely House*, 143 p., illus. by William D. Hayes, \$3. A highly informative book for teen-agers.

YOU AND THE UNIVERSE—N. J. Berrill—*Dodd*, 215 p., \$3.50. Brings together our knowledge of the universe, as seen by astronomers and astrophysicists, and of life as understood by biologists.

Science News Letter, November 8, 1958

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SURGERY

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The successful use of ear lobe tissue to repair nasal deformities in 17 patients was reported to the American Society of Plastic and Reconstructive Surgery meeting in Chicago by Drs. Gordon Davenport and Frank D. Bernard of the University of Wisconsin Medical School.

A "tongue-in-groove" technique was used in shaping both the skin and underlying fat from the ear to fit the damaged portion of the nose.

The ear lobe is a useful substitute when the nose tip, the outer edge of the nostrils or the fleshy end of the nasal septum are injured.

Advantages of the technique are simplicity, the good color match and the possibility of using grafts of considerable size.

Earlier at the meeting Dr. Clarence R. Straatsma of New York College of Medicine listed the upper eyelid, the forehead and behind the ear as possible sources of skin transplants to an injured nose. Suitable skin must be free from hair follicles and match the facial skin in color and texture. The latter requirement makes skin from parts of the body normally covered by clothing unsuitable.

Automobile accidents and fights provide a steady stream of patients with noses sufficiently damaged to require plastic surgery, Dr. Straatsma said.

Restoration of the nose's natural function is the primary aim in reconstructive surgery although achieving a satisfactory appearance is also important.

Science News Letter, November 8, 1958

Questions

ASTRONOMY—What are three reasons for giving solar studies from satellites high priority? p. 291.

GENERAL SCIENCE—How is the Cerenkov radiation used? p. 293.

PALEONTOLOGY—Where has a rich fossil find been made? p. 296.

PSYCHOLOGY—How does alcohol affect an extrovert's driving skill? p. 294.

Photographs: Cover, Sloan-Kettering Institute for Cancer Research; p. 291, U. S. Navy; p. 293, United Press International Telephoto; p. 295, Wonder Building Corporation of America; p. 298, American Cancer Society; p. 304, Eastman Chemical Products, Inc.

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DO YOU NEED SOMETHING MADE OR bought? Ideas developed; Prototypes made. We have for sale: Schlieren Type 79" Focal Length 12" diameter (surplus); 1909 Edison Cylinder Phonograph and 200 records; Terai Camera; Interferometer. Write Garnich, Box 2485, Dunellen, New Jersey.

Kodak reports on:

close-up photography: simple enough for junior, good enough for senior . . .
the difference between a 14-step synthesis and a 10-step synthesis



Uca pugnator, brandishing his fiddle. Note smooth "palm" on inside of large claw. In *Uca pugnax*, another abundant fiddler crab, there is ridge there.

Photograph made by new Kodak Startech Camera, device of utmost simplicity. Actually designed not only for zoologists and botanists but also dermatologists, dentists, dendrographers, dactylographers, and divers other professionals who intend to make close-up photographic records but haven't. All problems of lighting, exposure, and focusing eliminated by ingenious triple play involving flashbulbs, two different slip-on lenses, and two tiny diaphragm openings. Even has prism to correct viewfinder parallax. Kit includes flashbulbs, flashguard, batteries, lenses, neutral grey easel on which to set specimens, and starting roll of Kodak 127 Ektachrome Film for vivid color transparencies and prints too, as desired—all for around \$35. Write Eastman Kodak Company, Medical Division, Rochester 4, N. Y., for particulars, including name and address of scientific instruments dealer who handles outfit.

How above photo was made. ▼



This photo also by Startech Camera. Ideal Christmas gift even for younger scientists.

Monkshood and delphinium

Striving to make conversation, we closed our eyes and opened "Eastman Organic Chemicals List No. 41." Our blind finger fell on Eastman 7381, 7-Ethyl-3,4-dihydro-1-(2H)-naphthaleneone, bottom of p. 106. That would do. We looked up the records, and off went a letter to S. W. Pelletier of the Rockefeller Institute for Medical Research in-

quiring to what purpose he had had us prepare this compound. His response came by return of post.

Monkshood is like a wild delphinium. Beware. In man, the lethal dose for the aconitine from its leaves and roots is 2 to 3 mg. In ancient times this extract was used for arrow poison and for relief of hypertension, gout, and rheumatism. Absorbed through the mucosa or skin, it produces intense tingling and warmth, then peripheral anesthesia. On the central nervous system its effect is stimulation of the medullary vagal centers and slowing of the heart rate. "Is that so?" was once the appropriate next question. Intellectual fashions change. Today the proper question is "Why?" You want to know the molecular machinery.

In the middle of 1957, Pelletier put a young post-doctorate to work synthesizing a certain $C_{16}H_{15}N$ base which comprises all but six carbons of the atisine skeleton, one of the simpler aconitine alkaloid structures present in monkshood and delphinium. Duplication of the postulated molecule required a 14-step synthesis. Producing only 50 grams of the 4th step product took a week. Figuring the probable attrition in cul-de-sacs along the rest of the route, Pelletier wanted at least 500 grams at the end of the 4th step. Whereupon he thought of us. No strain here. Whereupon the 14-step synthesis shrank to a 10-step synthesis, with plenty of Eastman 7381 left over for others interested in monkshood and delphinium.

Dr. Pelletier can now unequivocally state [*J.A.C.S.*, 80, 2588 (1958)] that the $C_{16}H_{15}N$ base is 1-methyl-6-ethyl-3-azaphenanthrene. He also states, "I might add that the success of this work is due in no small measure to Eastman's supplying this material quickly and at a reasonable cost."

By "Eastman" he means Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company). Perhaps you, too, would like a free copy of List No. 41.

Price quoted is subject to change without notice.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 960. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **SUN-TAN BOX** can be used in mid-winter on rooftops or in backyards. Metalized polyester film on the sides and 27-square-foot floor of the portable box reflects and concentrates the sun's rays and creates a pool of warmth. The open-top box can be rolled into a bundle, weighing about 10 pounds, for storage or transportation.

Science News Letter, November 8, 1958

❁ **GLASS GEIGER COUNTER** is non-photosensitive and permits high beta radiation transmission. Halogen-quenched, it has a transparent, non-metallic conductive cathode surface. The counter has 200-volt minimum plateaus with less than three percent plateau slope and can operate up to 280 degrees centigrade with no change in operating characteristics.

Science News Letter, November 8, 1958

❁ **WRIST RADIO** uses no battery and no ordinary electrical outlet. By connecting a wire to metal or to any ground such as a telephone finger-stop or a radiator, the user can tune in to local stations. It comes with an earphone.

Science News Letter, November 8, 1958

❁ **DEPTH GAUGE**, shown in the photograph, for skin divers gives accurate readings down to 200 feet. Contained in a black



plastic case, it has a luminous dial under a curved, pressure-resistant lens of the same plastic material. It is watertight and worn like a wrist watch.

Science News Letter, November 8, 1958

❁ **TWO-PIECE SLEEPER** for children six months to six years keeps them warm even if they throw their blankets off during the night. Made of soft, lightweight blend of acetate, nylon and acrilan fibers, the sleeper

is designed to provide warmth without the weight or danger of loose blankets. The trousers have an elasticized waist and plastic fabric covered foot pads to give protection against slipping on bare floors.

Science News Letter, November 8, 1958

❁ **LENS CLEANER** has a lubricating action which prevents the grinding of dirt into the lens. It does not contain an alcoholic solvent. It is applied with a drop-applicator bottle that holds enough fluid for more than 1,000 cleanings.

Science News Letter, November 8, 1958

❁ **HYDROELECTRIC DAM AND GENERATOR KIT** enables children to build their own dams. The reservoir is molded from plastic and the use of clear plastic in the generator unit permits observation of working parts. Six volts A.C. are generated—sufficient to light a lamp, ring a bell or operate a small D.C. motor.

Science News Letter, November 8, 1958

❁ **PROFESSIONAL SLIDE RULE** is shirt-pocket size and has 23 scales. Overlaid with celluloid, it has a sealed-in silica lubricant. The trigonometric scales are color-coded for use in conjunction with the C, D and CI scales, also of the same color.

Science News Letter, November 8, 1958



Nature Ramblings



By HORACE LOFTIN

► **MAKE** a guess: what is the greatest killer of human beings among the poisonous animals of America?

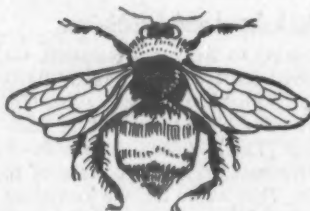
Rattlers? Black widow spiders? Gila monsters?

None of these rank with the bees and wasps as killers. Probably the familiar bumble bees and honey bees kill more persons each year than all the poisonous reptiles combined.

These insects do not possess the deadly poisons of the reptiles or the black widow. Their lethal effects are on those people who are strongly allergic to the chemical substances injected when the bee stings a victim. Some people barely feel the sting of a bee. Others react immediately, with great swelling and much pain. If stung enough times, highly sensitive persons may and do die from the allergic reaction.

An insect does not have to be a killer to

Dangerous Animals



be remembered by his victim. Recently a naturalist was removing the weekly collection of fallen leaves from his garden. In raking the yard, he disturbed a nest of ants. Then, when he picked up the leaves, the ants climbed over his hand. They seemed to bite together as if on a signal. In a flash, his whole hand burned; within a few minutes his wrist was swollen nearly twice normal size.

The real trouble began about two hours later. Then he got a dull pain in his abdomen, which continued to grow in intensity. By nighttime, he took to his bed with acute stomach cramps, chills and fever. It was a wonderfully simulated attack of appendicitis!

He was still feeling the effects two days later.

He should not have been surprised at his reaction to the ants. While bees, mosquitoes and other such biting insects do not trouble him much, he always had festering wheals with ant bites. In this case, the number of the bites was just too much for his system.

In nature, the well-known dangerous creatures are often readily recognized as such and are treated with caution. Thus they cause relatively little trouble. But the less obviously dangerous beings are often ignored, leading to their relatively greater harm to man.

Science News Letter, November 8, 1958

